REMARKS

By the above actions, claims 1 and 16 have been amended. In view of these actions and the following remarks, further consideration of this application is now requested.

Claims 1-17, 20 and 21 have been rejected under 35 USC § 112 as being indefinite due to use of the term "much shorter." In view of the deletion of the word "much," these claims are now clear and definite so that this rejection should be withdrawn and such action is requested.

Claims 1, 2, 5, 7, 9, 16, 20, and 21 have again been rejected under 35 USC § 103 based upon the German reference to Popp when viewed in combination with the patent to Zyl, while the other claims have again been rejected based on this combination of references when viewed in further combination with one of the disclosures of Bruccoleri et al., Henson, Takamuki, Haynes and Brennen et al. for the reasons noted at length by the Examiner in his Action. Likewise, applicant continues to believe that these rejections are inappropriate and should be withdrawn for the following reasons.

The invention relates to an electrical transducer using a two-wire process, with an analog sensor, an analog end stage which is connected downstream of the sensor and a processor circuit, wherein the transducer has an analog transmission path and a digital transmission path which is located parallel to the analog transmission path. Such a transducer is disclosed by Popp (DE 40 16 922 Al), as it is mentioned in paragraph [0006] of applicants' specification.

To reduce a power consumption of the processor circuit, in the known electrical transducer (Popp), **the processor circuit is operated at a low clock frequency**. This can be clearly seen from the description, column 1, lines 49-59 and the corresponding English translation, paragraph [0004]:

> The processing of measuring values for dynamic processes takes place on the analog transmission path only. The processor merely carries out corrective interventions on the analog transmission path. The configuration of the measuring transducer and the communication with the external auxiliary devices or computers takes place via the digital transmission path without interrupting the transmission of the measuring values. ***The invention makes it possible to realize low clock frequencies for the processor and the analog/digital converter and therefore a low current consumption.***

Popp only discloses an electrical transducer with a processor operated at a low clock frequency. Operating the processor at a low clock frequency clearly means that there is no need to shift the processor into a sleep mode to achieve low current consumption because, with the processor operated at a low clock frequency, current consumption is low.

On page 13 of the Office Action, the Examiner has stated that:

> Popp's disclosure that "[t]he processor merely carries out corrective interventions on the analog transmission path," does suggest that the processor is not active during normal measurement operation, but is only active to perform corrections once the pressure has been measured.

However, as mentioned above, the Popp reference does not disclose that the processor should not be active during normal measurement operation and the Examiner's conclusion as to what the quoted statement might "suggest" is incorrect.

In fact, the microprocessor used by Popp does *not* carry out *only* corrective interventions on the analog transmission path, but the microprocessor also exchanges digital data with an external communication unit. The data exchange is realized by means of high frequency signals with the 4 - 20 mA signal superimposed thereon in such away that its mean value is not compromised (paragraph [00021] of the English translation). Additionally, in column 2, lines 47 - 54 of Popp and in paragraph [0010], on page 5 of the Office's English translation thereof, it is stated that:

> The amplifier circuit 12 is connected in series to a measuring transducer interface 13. The measuring transducer interface 13 combines the analog transmission path of the measuring transducer consisting of the combinatorial circuit 6 and the amplifier circuit 12 with the digital transmission path of the measuring transducer consisting of the processor circuit 7. The measuring transducer interface is conventionally connected to a control room ... via a two-wire line 14.... The communication with the processor circuit 7 is realized by means of a not-shown communication interface that is connected to the two-wire line 14. The analog transmission path for the output signal of the sensor 1 ...consists of the combinatorial circuit 6, the amplifier circuit 12 and the measuring transducer interface 13. The output flowing through the two-wire line 14 immediately follows changes in the differential pressure dp.

Thus, if "during normal operation of the electrical transducer," the microprocessor were to be "shifted temporarily from an awake mode into a sleep mode in which the processor circuit is inactive," as claimed here, it would not be possible for the microprocessor to exchange digital

data with an external communication unit because there would not be any data signals from the microprocessor at the second input of the transducer interface 13. As it is clearly described in the Popp reference, the measuring transducer interface 13 combines the analog transmission path with the digital transmission path. If the microprocessor were to be in a sleep mode, such combination would be impossible.

Finally, on page 14 of the Office Action the Examiner asserts that Figure 1 taken together Popp's statements concerning use of the processor circuit 7 to calculated correction signals indicates to him that:

> the processor circuit does not perform any operation until the differential pressure dp is output from the transducer and therefore Popp does not suggest that the processor needs to be active during normal operation of the electrical transducer, but rather suggests that the processor has no use until the electrical transducer has already sensed the differential pressure dp.

This characterization of the Popp reference is clearly erroneous and is based on an incorrect interpretation of what is disclosed in this reference. As can be seen from Figure 1, the sensor 1 determines - at the same time - the differential pressure dp, the static pressure p and the temperature T and converts these parameters into corresponding analog signals. At the same time, as the analog signal corresponding to the differential pressure dp is fed to the first input of a combinatorial circuit 6, this signal is also fed to the input of the analog/digital converter 5.3. Thus, while the processor circuit does not perform any operation until the differential pressure dp is output from the sensor (not the transducer), this also applies to the combinatorial circuit 6 as well as to the whole transducer.

It should be clear, that during normal sensing operation of Popp's transducer, the sensor 1 determines the differential pressure dp to be measured. This can be seen from the last two sentences in column 2 and paragraph [0010] of the English translation:

> The analog transmission path for the output signal of the sensor 1 that corresponds to the differential pressure dp consists of the combinatorial circuit 6, the amplifier circuit 12 and the measuring transducer interface 13. The output current flowing through the two-wire line 14 immediately follows changes in the differentlal pressure dp.

Clearly, sensing of the differential pressure dp by the sensor 1 is the normal sensing operation of the transducer disclosed by Popp, a fact that does not appear to have been taken into consideration in formulating of the outstanding rejections, and during this normal

sensing operation, the processor cannot be inactive for the reasons indicated.

Furthermore, because Popp discloses an electrical transducer in which the processor circuit is operated at a low clock frequency, which results to a low current consumption, there is no need to shift the processor circuit temporally into a sleep mode.

As for the Zyl patent, as noted in applicants' prior response, the transducer arrangement of this patent does not have an analog measurement signal transmission path. Furthermore, as can be seen from the description of column 2, lines 13-38, Zyl teaches two alternative manners for achieving low power consumption. One technique is analogous to that of Popp in that the clock rate of the processor is reduced, only in this case it is reduced proportionally to a power deficit condition, thus affecting processing speed in a similar manner to the technique of Popp. In the other technique, to which the Examiner makes reference, when a deficit in the ability of the power regulating circuit to meet the requirements of the processor is detected, the processor is shifted into a "'sleep' mode in which program execution is halted." In both of these alternatives, initiation of the power reduction or the sleep mode is triggered by the occurrence of a power deficit.

Thus, a person of ordinary skill viewing the combined teaching of Popp and Zyl, would consider Zyl's alternative technique of adjusting clock speed as the logical modification to apply to Popp since it is related to and compatible with Popp's concept. However, even if Zyl's primary technique of sending the processor into an inactive sleep mode were to be applied to the process and device of Popp, it would not lead to the present invention but rather would result in a transducer having an analog transmission path and a digital path in which the digital path is operated at a low clock frequency during normal operation and **only if there is a power deficit**, would the processor be shifted into a sleep mode, the Examiner having ignored Zyl's disclosure of this condition as the triggering factor of use of his sleep mode. Moreover, since the processor is operated at a low clock frequency during normal operation in accordance with Popp's teachings, it is unlikely that the processor would need to be shifted into a sleep mode at all (keeping in mind that Zyl's alternative mode in which the clock rate of the processor is reduced requires no sleep mode), and in any case, the time during which the processor would need to be shifted into the sleep mode would most certainly be much shorter than the time during which it is active, the direct opposite of the present invention.

Moreover, the Examiner's basis for combining of these references is fundamentally flawed not only because of his failure to consider that Zyl's sleep mode is not triggered during normal operating conditions, but rather is used only in the exceptional case of a power deficiency, but it also is flawed because of the errors in his assessment of Popp's disclosure as explained at length above. In this regard, the Examiner's attention is directed to column 6, first full paragraph in which Zyl notes that "the microprocessor must remain fully operative during "real time" operations, a teaching that dictates that the processor of Popp be active for enabling the output current flowing through the two-wire line 14 to immediately follow changes in the differentlal pressure dp as quoted above.

Thus, any combination of the Popp and Zyl references that is made in a manner consistent with their teachings could not lead one of ordinary skill to the applicants' claimed invention. Therefore, the rejections based in whole or in part on the combination of the Popp and Zyl references should be withdrawn and such action is hereby requested.

Relative to the rejection of claims 14 & 15, it is pointed out that Brennan does not disclose an electrical transducer comprising an analog sensor, but rather discloses a two-wire/three wire utility data communications system for remotely reading utility meter registers using a hand-held reading unit. Therefore, if this reference is compared with the present patent application, the claimed electrical transducer must be compared with the electric meter 47 and not with the reader/programmer 1.

As can be seen from Figure 8 of Brennan et al., the reader/programmer 1 comprises a two-wire input/output circuitry 67 **and** a three-wire/fourteen wire input/output circuitry 69, which are both connected with a microprocessor 64. Additionally, the reader/programmer 1 comprises a battery 79 which supplies DC power to microprocessor 64, two wire I/O circuit 67, three-wire/fourteen wire I/O circuit 69 and other related circuitry of reader/programmer 1. Therefore, Brennan et al.'s reader/programmer 1 comprises at least five outputs and - always - two power supply terminals connected to the battery 79.

Because the known reader/programmer I comprises a battery, a detector means for the power supply voltage that is applied to one of the power supply terminals is unnecessary.

Brennan et al.'s reader/programmer 1 can be used in both two-wire inductive coupling and three-wire metallic coupling modes, as can be seen from column 3, lines 15 – 30, where it is stated that:

> Thus, the utility meter data communication system of the present invention is adaptable for operation in both two-wire and three-wire modes. Preferably, when operating in the two-wire mode, the remote reader/programmer and encoder are inductively coupled....
>
> When in the three-wire mode, the remote reader/programmer and encoder are directly, electrically coupled over at least three-wires with the first-wire carrying clock signals generated by the reader/programmer, a second line carrying data signals from the encoder and a third line constituting electrical ground.

The way that the known reader/programmer 1 is shifted from the two-wire mode to the three-wire mode is described in column 19, lines 41- 59 as:

> Upon contact of sensor switch 85 with the surface of the button-like inductive port 7 of two wire local network 43 shown in Fig. 1, the closure of switch 85 indicates to the two wire I/O circuitry 67 that probe/adapter 9 is in contact with two wire port 7.
>
> The closure of sensor switch 85 causes two wire 110 circuitry 67 and microprocessor 64 to be activated for the purpose of either reading or programming any encoded registers connected to the two wire local network 43. It should be noted that reader/programmer 1 may further include a manual trigger 87 (see Figs. 1 and 8) which is a normally-open switch that can be used to manually activate the two wire or three/fourteen wire I/O circuits 67 and 69 and microprocessor 64."

Therefore, beside the fact, that Brennan does not disclose an electrical transducer having an analog sensor, the known reader/programmer 1 operates in the two-wire mode depending of the state of a touch-sensitive switch 85 or a manual trigger 87.

As a result Brennan et al. does not and cannot disclose or suggest the features of claims 14 & 15. That is, nothing in Brennan et al.'s disclosure could teach having one of three power supply terminals connected to a detector means so that, when a predetermined power supply voltage is applied to the connected one of the power supply terminals, the transducer automatically switches to three-wire operation, and the same is true for having the detector means connected to the processor circuit so as to cause the processor circuit to permanently shift into the awake mode during three-wire operation.

As for the other references relied upon secondarily by the Examiner with respect to claims 3, 4, 6, 8, 10-15, and 17, none of these references teach the concept of the present invention which distinguishes the present invention from that of Popp and Zyl. Therefore,

even if it were obvious to apply their teachings to Popp and Zyl, the result could not lead to the presently claimed invention given the above noted reasons why these two references cannot lead to the present invention.

Accordingly, it is submitted that the Examiner the outstanding rejections based in whole or in part upon the combination of the Popp and Zyl references should now be withdrawn and such action is hereby requested.

The other newly cited references that have not applied by the Examiner have been taken into consideration. However, since these references were not found to be relevant enough by the Examiner to apply against the claims, no detailed comments thereon are believed to be warranted at this time.

While the present application is now believed to be in condition for allowance, should the Examiner find some issue to remain unresolved, or should any new issues arise, which could be eliminated through discussions with applicant's representative, then the Examiner is invited to contact the undersigned by telephone in order that the further prosecution of this application can thereby be expedited.

Respectfully submitted,

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